

Chapter 5

Proposed Air Defense Systems

NIKE X ANTIMISSILE MISSILE SYSTEM

The Nike X antimissile missile system, a highly advanced defense against ICBM's and shorter range ballistic missiles such as those launched from submarines, is the only missile system of this type under development in the free world. The Department of Defense has accorded the Nike X development program the highest priority.

The system is designed to operate under a variety of attack situations, including those involving multiple ICBM's and ICBM penetration aids such as decoys and countermeasures. It will be capable of engaging a number of targets simultaneously.

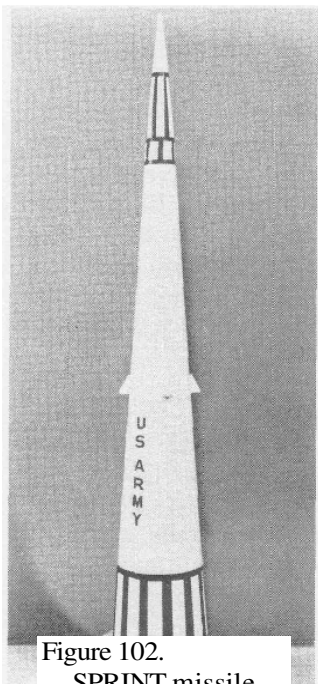


Figure 102.
SPRINT missile

The Nike X system is unique among Army missile systems from a standpoint of design as well as function. It will be the first Army system to use phased-array radars instead of conventional radars. In terms of acceleration, the SPRINT (Solid-Propellant Rocket INTerceptor) missile (fig 102) used with the system will have the highest acceleration of any Army guided missile ever developed.

The Nike X system will consist of a control center and a launching site. The control center is the nerve center of the Nike X operations. At this center will be located the multifunction array radar (MAR), the system's high-speed digital computers, and a major part of the complex electrical and electronic equipment necessary to complete an engagement. The launching site is where the interceptor missiles will be housed in underground cells from which they will be fired. Also located at the launching site will be a missile site radar (MSR). This radar provides a guidance link with interceptor missiles while en route to their targets. Several launching sites may be associated with one control center.

Both the MAR and MSR are phased-array radars. Unlike conventional radars with moving antennas, phased-array radars have relatively few moving parts. Scanning is accomplished by electronic switching which directs, or bends, the radar beams at their source. Because of the speed at which this electronic switching can be carried out, the radar can virtually look in every direction at once.

During operation, the MAR will perform the functions of at least three types of conventional radars. It will perform acquisition, the initial detection and tracking of a target; discrimination, the investigation of targets to determine which are valid warheads and which, if any, are decoys; and target tracking, the providing of precise tracking information on the

target. Discrimination involves sorting valid warheads from decoys such as radar reflective materials and dummy warheads which might be flown with the warhead to confuse the defense. The computer in the system will analyze the data gathered. Acting on this information, it will automatically conduct an engagement from the initial detection of a target through discrimination, guidance of the interceptor missile in flight, and detonation of the warhead of the missile.

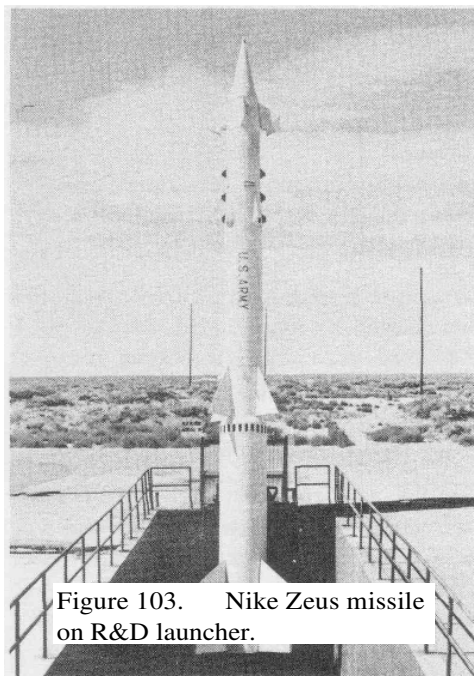


Figure 103. Nike Zeus missile on R&D launcher.

One of the two interceptor missiles, the Zeus (fig 103), has a long-range capability. It can engage *and* destroy a target outside the earth's sensible atmosphere. The high-acceleration SPRINT missile will be used for shorter range intercepts. With its high-speed digital computers and extremely fast SPRINT missile, the Nike X system will be capable of killing a target within seconds. In the case of a multiple ICBM attack or an attack involving decoys, the system will be capable of engaging a number of targets simultaneously.

Nike X is the fourth-generation Nike missile system. Its roots stretch back to 1945 when work was started on the Nike Ajax which became the Nation's first AD missile system. Development of the Nike X system as such began in January 1963; however, Nike X evolved directly from the Nike Zeus antimissile system which had been in development since 1957. Nike X will represent a number of state-of-the-art improvements to the Zeus system.

During its development program, the Nike Zeus system achieved a number of test ICBM intercepts involving special target vehicles launched by Atlas and Titan I ICBM's. The intercepts were made by the Nike Zeus system at Kwajalein Atoll in the mid-Pacific. Nike X components are being tested at several locations throughout the United States. Outside the continental limits of the country, tests are being carried on at Kwajalein Atoll in the Pacific. Live firing tests are conducted at White Sands Missile Range and Kwajalein Atoll.

The first test version of the MAR is located at White Sands Missile Range (fig 104), and a later version is scheduled for Kwajalein. Intercept trials, similar to those conducted with the Nike Zeus system, will be held at Kwajalein Atoll.

Western Electric Company is the prime contractor for the Nike X system. Bell Telephone Laboratories is responsible for system design and development. The missile subcontractors are Martin Company, Orlando, Florida, for SPRINT and Douglas Aircraft Company for Zeus. More than 15,000 firms throughout the United States are involved in the development program as contractors, subcontractors, and vendors. A large number of Government agencies are also contributing to the development program.

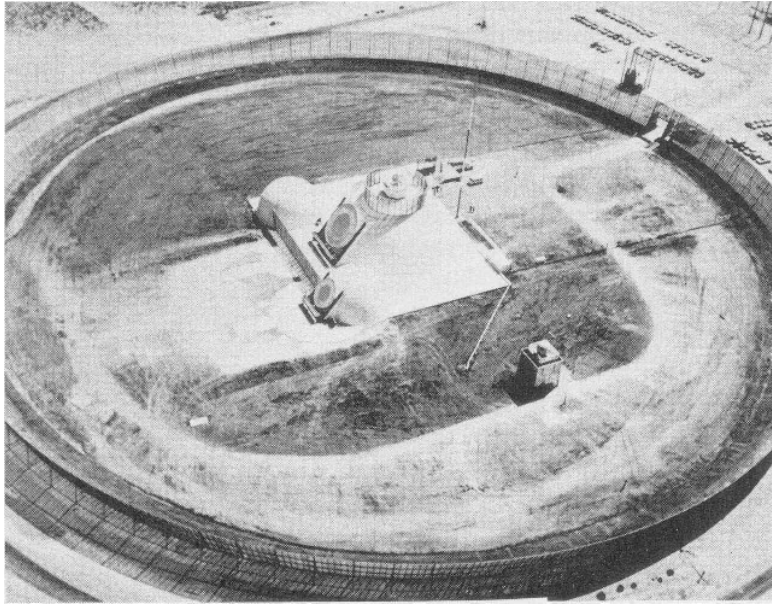


Figure 104. MAR I at White Sands Missile Range

The Air Defense School has been an active participant in the planning for both Nike Zeus and Nike X. Contributions by the School include preparation of advance training plans, participation in maintenance and manning study groups, and attendance at in-process and quarterly reviews.

MAULER



Figure 105. Mauler model.

Mauler is being considered as a forward area weapon (FAW) for air defense of the Army in the field (fig 105). It is designed to provide forward elements in a combat area with an all-weather defense against manned aircraft, drones, and tactical ballistic rockets. Mauler is a light, self-propelled, air defense missile system that is air-transportable. It is versatile and highly mobile. The system, entirely contained on a single tracked vehicle, will normally carry a three-man crew consisting of two air defense crewmen and a driver. Mauler's mobility, target-handling capability, and effectiveness against the air threat will provide major improvements in the air defense of the forward combat area. The Mauler program is presently undergoing a system reevaluation. Training planning has been suspended until a new program has been established.

REDEYE

Redeye (fig 106) is a man-transportable, shoulder-fired, low-altitude, air defense system to be used for protection of frontline troops. Redeye, which will be employed with company-size units, will be capable of engaging a wide variety of targets, to include jets, helicopters, and reconnaissance drones. Redeye is presently undergoing engineering and service tests and should be in the field in the near future.



Figure 106. Redeye firing.

The Redeye weapon system (fig 107) is composed of four basic elements: the weapon, which includes the missile and launcher; a shipping and storage container; a test set for use at depot and ammunition supply points; and training devices.

The missile, stabilized by spring-loaded fins and steered by spring-loaded variable incident wings, has an infrared homing guidance system, a solid propellant motor, and a high-explosive warhead. The missile is fired from a launcher approximately 4 feet long and about 3 inches in diameter. The launcher, when loaded, weighs about 28 pounds and serves as the shipping container for the missile. Redeye will be operated by one man and will require a minimum of organizational maintenance.

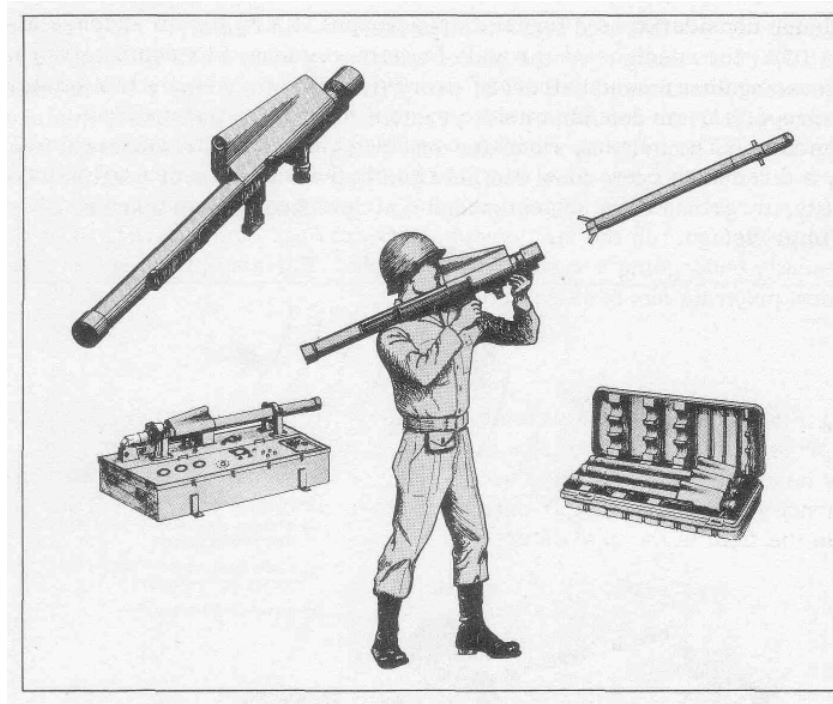


Figure 107, Redeye.

The firing procedures are relatively uncomplicated and rapid (fig 108). After a quick go-no-go check, basically a visual inspection, the gunner is ready to engage hostile aircraft. On sighting an aircraft, the gunner will identify it and, if hostile, determine when he can best engage the target. The gunner will track the hostile target in an optical sight and, at the appropriate time, energize the missile guidance system. A buzzer located in the tracking scope cover and an indicator lamp in the tracking scope reticle indicate to the gunner that the infrared seeker has locked on the infrared energy being emitted from the aircraft. After assuring that the target is within range, the gunner fires the missile. When the missile is fired, a booster charge propels the missile out of the launcher. When the missile is clear of the launcher by a distance sufficient to protect the gunner from blast effect, the main rocket ignites and provides sufficient thrust to propel the missile to the target. Electromagnetic energy in the infrared region generated by the target provides the necessary signal for Redeye homing guidance. After firing, the gunner can discard the launcher. Where practicable, and in a training environment, the discarded launchers will be collected for reloading. The weapon is envisioned to be employed by two-man firing teams which have their own transportation and communications.

The gunner has a most important function as far as system effectiveness is concerned: he is the radar, the identification system, and the computer. He acquires, identifies, and tracks the target; then he fires the missile.

Gunner training will include nomenclature and functioning, maintenance, aircraft identification, recognition and range estimation, system effectiveness and limitations, siting requirements, tactics of low-flying aircraft, communication procedures, Redeye team tactics,

command and control, weather and terrain effectiveness, and safety. This training will be conducted in a 100-hour course. At the end of training, gunners will participate in a range firing exercise with an estimated one out of every five gunners firing a live missile. It is planned that there will be no annual service practice for Redeye gunners. Replacement gunners will be trained annually on a one-for-one basis which will eliminate transportation requirements to a suitable range area and also build up the number of qualified Redeye gunners in the field. It has been recommended that qualified Redeye gunners be identified by an additional MOS digit.

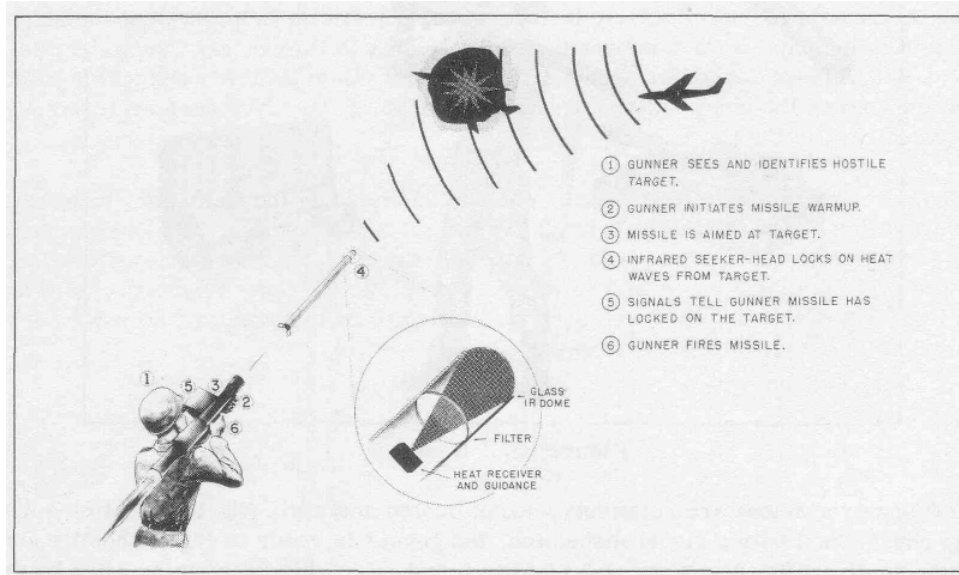


Figure 108. Redeye firing procedure.

The Air Defense School and other combat arms schools will conduct orientation training for officers and supervisor personnel. This training will initially consist of a 2-hour orientation course and a longer, more detailed course when Redeye is issued to units. To insure uniform instruction, the Air Defense School will prepare these courses for all USCONARC service schools.

Since actual training cannot be conducted on tactical hardware, three training devices are under consideration. One of these is an electronic simulator which will be a full-scale model, identical to Redeye in weight, size, and handling characteristics. Infrared tracking capability, sensing capability, and positioning of the controls will be identical. This trainer will duplicate everything except firing a live missile and will have a read-out device to allow an instructor to determine that the operating sequence has been followed correctly. The eject-only trainer is another of the devices. It contains complex electronics; however, it will have the capability of firing an eject-only round, which allows the trainee to experience the ignition and noise of the booster and the resultant torque and loss in weight as the missile leaves the launcher. With a nonexplosive insert, it will serve as a handling trainer during field exercises and is less costly and more durable than the electronic trainer. Due to the large number of targets that will be required for Redeye gunner training, a moving target

simulator is also being considered. Using this simulator, the trainee gunner could gain experience with numerous targets under a variety of environments. This device would also allow training in an environment that would be unsuitable for actual aircraft flights.

Redeye, coupled with a well-trained gunner, will be an effective and lethal air defense weapon in the hands of forward combat units.

SURFACE-TO-AIR MISSILE DEVELOPMENT (SAM-D)

The requirement for an improved surface-to-air missile system developed during an evaluation of field army air defense conducted by Combat Developments Command late in 1962. The Air Defense School and Combat Developments Command Air Defense Agency were represented on the committee which recommended an improved surface-to-air missile system for defense of the field army.

SAM-D is to be an air defense system capable of defending the field army against the air-supported threat and tactical ballistic missiles. The system is to be mobile, capable of engaging several targets simultaneously, and will have a high system-reliability factor. SAM-D will give additional assurance of adequate protection of forces operating with the field army. This extremely advanced system, which will be mounted in a minimum number of vehicles, is in the extremely early development stage.

Chapter 6

AD training Matters and Instruction

NONRESIDENT INSTRUCTION

AIR DEFENSE OFFICER CAREER COURSE - USAR SCHOOL

The Air Defense Officer Career Course (USAR School) provides a means for Reserve officers not on active duty to participate in the Army officer military education program. This course of instruction parallels the resident Associate Air Defense Officer Career Course taught at the Air Defense School.

Beginning with FY 63, the course extends over a 3-year period. Each year is comprised of a Reserve duty phase of 48 hours of instruction presented at each of 33 Air Defense USAR Schools and an active duty phase of 80 hours presented at the Air Defense School at Fort Bliss. Individuals desiring additional information may contact the USAR School in their area.

ROTC SUPPORT PROGRAM

Cadets of the air defense artillery Reserve Officers Training Corps follow AD subject schedules and Army training programs prepared by the Reserve Program Division, Nonresident Instruction Department, U.S. Army Air Defense School. Instructional material on such subjects as electronics, AD missiles, and techniques of ADA employment are tailored to the air defense ROTC program.

For general military science ROTC cadets, the Reserve Program Division provides orientation instructional material for subject schedule, Role of Artillery; and the ROTC manual, Branches of the Army.

STAFF TRAINING PROGRAM

A special catalog, Staff Training Material for Reserve Components, is published annually by the Air Defense School. The staff training program assists National Guard and Reserve unit commanders in training subordinate commanders and AD staff officers from battalion through division levels. Agencies desiring catalogs may obtain them by writing to Commandant, U.S. Army Air Defense School, Box 9300, ATTN: NRI Department, Fort Bliss, Texas 79916.

INSTRUCTIONAL MATERIAL CATALOG

The U.S. Army Air Defense School publishes a catalog of instructional material each year. This catalog lists material on air defense and associated military subjects taught in School resident courses. Agencies desiring catalogs may obtain them by writing to Commandant, U.S. Army Air Defense School, Box 9300, ATTN: NRI Department, Fort Bliss, Texas 79916.

EXTENSION COURSES

The Army Extension Course Program is designed to provide progressive military education for personnel of all components of the Army. Extension course study provides one of the best means for Reserve Component officers to satisfy recommended military educational requirements for promotion and to earn retirement points. For active duty officers who desire to prepare themselves for new duty assignments or resident instruction, extension courses can provide valuable assistance. All members of the Armed Forces, Department of Defense civilians, and Allied military personnel (through MAAG) may enroll in this program.

AD extension courses closely parallel corresponding resident courses, offering an excellent means for officers and enlisted men of all components to continue their military education. The Basic Course provides the newly commissioned officer with general training in air defense. The Familiarization Course provides basic branch training for officers transferring into air defense from other branches. The Career Courses are designed to broaden the officer's professional knowledge. The Artillery Officer Career (Reserve Component) Course, Air Defense C24, combines the advantages of resident instruction at Fort Bliss with extension course study. Completion of the Basic, Familiarization, or Career Extension Courses provides an officer with the same credit as the corresponding resident course. Preparatory courses for resident instruction cover those subject areas that have been found to be the most difficult for resident students and have proven a valuable aid for the prospective student. Special courses and selected subcourses are designed to provide personnel with instruction on specific subject areas. In 1964, six new special extension courses were made available for enlisted personnel. These courses provide background information for a particular MOS to enable enlisted personnel to perform their assignments more efficiently. Selection of subcourses and their administrative sequence are determined by the students.

The administration of the Air Defense Extension Course Program was transferred from the U.S. Army Artillery and Missile School to the Air Defense School during 1962. This transfer has resulted in a more direct student-counselor relationship and less delay in updating ADA extension courses. During 1964, four active duty (resident) phases of the Artillery Officer Career (Reserve Component) Course C24 were conducted.

The Extension Course Program is constantly being updated. During 1964, the Air Defense School published 6 new subcourses and revised 11 existing subcourses. In the listing below, new subcourses are marked by asterisks.

Subcourse No.	Title	Credit
<u>hours</u>		
613	ADA Staff Estimates and Orders	11
*614	Principles of Army Writing	4
625	ADA Communications	19
*631	ADA Fire Distribution Systems	12
676	Hawk Guided Missile System	26
683	Introduction to Surface-to-Air Missiles	10
689	Defense Acquisition Radars: Materiel and Employment	
20		
691	Nike Hercules Battery Control Area	24

Subcourse		Credit
No.	Title	
<u>hours</u>		
692	Nike Hercules Launching Area	16
693	ADA Automatic Weapons: Gun M42	16
*713	Air Defense Familiarization	15
715	ADA Organization and Operations	12
717	Basic Air Defense Tactics	15
719	Advanced Air Defense Tactics	15
*723	Air Defense Nuclear Weapon Effects and Employment	
3		
*763	Introduction to Armored Cavalry Units	3
*694	Nike Hercules Battery	16

TRAINING LITERATURE

The Combat Developments Command Air Defense Agency is responsible for preparing all doctrinal AD training literature published as field manuals. The Air Defense School has the responsibility for preparing all Army-wide, applicatory-type AD training literature in the 44-series published as field manuals, training circulars, DA pamphlets, Army training programs, Army subject schedules, and Army training tests.

Recently published training literature prepared by USACDCADA includes:

FM 44-1	U.S. Army Air Defense Employment
(S) FM44-1 A	U.S. Army Air Defense Employment (U)
FM 44-96	Air Defense Artillery Missile Unit, Hawk (Battalion and Battery)
(S) FM 44-96A	Air Defense Artillery Missile Unit, Hawk (Battalion and Battery) (U)

Training literature prepared by the Air Defense School which has recently been published or will be published in the near future includes:

FM 44-15	Air Defense Artillery Individual Training Guide
FM 44-15-1	Nike Hercules Fire Control Crewman Training Guide
FM 44-82	Procedures and Drills for Nike Hercules Systems
FM 44-98	Hawk System Engagement Simulator
(C) FM 44-98A	Hawk System Engagement Simulator (U)
TC 44-7	Field Army Air Defense Liaison with Air Force Tactical Air Control System
TC 44-10	Air Defense Missile Fire Control Crewman (Hawk) Training Guide
TC 44-11	Air Defense Missile Crewman (Hawk) Training Guide
TC 44-12	Air Defense Artillery Radar Clutter and Coverage Diagrams
ATP 44-2	Air Defense Artillery Brigades, Groups, and Missile Units
ASubjScd 44-1	Army Air Defense Fire Distribution Systems
ASubjScd 44-2	Visual Aircraft Recognition
ASubjScd 44-10	Section Training of Air Defense Element, Tactical Operations Center

ASubjScd 44-11	Tactical Air Control Center and Control and Reporting Sections
ASubjScd 44-21	Air Defense Artillery Operations and Intelligence Section
ATT 44-235	Air Defense Artillery Missile Units (Hawk)

Other AD training literature in the nondoctrinal field programed for development or revision during 1965 includes:

FM 44-7	Air Defense Artillery Electronic Search Centrals
FM 44-12-2	Nike Hercules System Engagement Simulator
(C) FM 44-13	U.S. Army Air Defense Fire Distribution System (Missile Monitor) (U)
(C)FM44-14	U.S. Army Air Defense Fire Distribution System (BIRDIE) (U)
FM 44-15-2	Nike Hercules Missile Crewman Training Guide

The Department of the Army distributes training literature as guidance for training AD units and individuals in the Active Army, Army Reserve, and Army National Guard. In addition, many of these publications are made available to Allied nations.

Each School-produced publication is assigned to a project officer who keeps a file in which all subsequent changes are posted. When the importance of the posted changes warrants, a revision or change to the publication is initiated. Individuals and commanders are encouraged to submit recommendations for improvement of applicatory-type AD training literature direct to the Commandant, U.S. Army Air Defense School, ATTN: AKBAAS-DR, Fort Bliss, Texas 79916.

MOS EVALUATION TESTS

The Air Defense School provides the Enlisted Evaluation Center (EEC), an agency of the Office of Personnel Operations, Department of the Army, at Fort Benjamin Harrison, Indiana, with the necessary material to produce military occupational speciality (MOS) evaluation tests for 15 ADA MOS's containing 50 skill levels and requiring the annual review and change of approximately 7, 500 test questions. The School also provides EEC with the necessary material to produce seven Signal Corps fire distribution system maintenance MOS evaluation tests containing 16 skill levels, requiring the annual review and change of about 2, 300 test questions.

TRAINING FILMS

The U.S. Army Air Defense School assists USCONARC in the development of long-range AD training film programs and the Army Pictorial Center in the production of these films. The Training Films Liaison Officer plans the annual training film program and coordinates the production of AAD films.

Recently released AD training films include:

TF	44-2930	U.S. Army Tactical Fire Distribution System—Part V: Solution of the Ground-to-Slant Converter
(C) TF	44-3395	Space Technology—U.S. Army—Part II: Satellite and Space Vehicle Intercepts and Orbits (U)

Air defense training films scheduled for release early in 1965 include:

TF 44-3378	AN/TSQ-38 System Integration
TF 44-3527	Tactical Doctrine for an ADA Defense Composed of Nike Hercules Weapons—System Operation in an ECM Environment, Part I (CMHA) TF 44-3528 Tactical Doctrine for an ADA Defense Composed of Nike Hercules Weapons—System Operation in an ECM Environment, Part II
TF 44-3502	The Nike Hercules Electronic Frequency Selection High-Power Acquisition Radar: Removal and Replacement of the Klystron
TF 44-3554	The Mobile Nike Hercules Launcher

AD training films currently under production and due to be completed early in 1965 include:

General Principles of Parametric Amplifier
ECM Environment in Improved Nike Hercules — Tracking Station—Responsibilities
of Tracking Supervisor Introduction to the
Hawk System The Hawk Battery Sequence of
Engagement

AUTOMATION AND TECHNAMATION PLANNED FOR BASIC ELECTRONICS INSTRUCTION

The Basic Electronics Division, Electronics Department, U.S. Army Air Defense School, is presently attempting to make instruction more appealing and informative by employment of some of the newer innovations in instructional equipment and technique.

A current experiment includes the use of a tape recorder, 35-mm projector, and pro-gramer in combination to give an audio-visual review to classes on each subject taught. The review will consist of 15 to 20 minutes of narration during an automatic visual presentation of colored slides. The number of slides for each subject will vary from 60 to 80, depending upon the material. The presentation is continuous for the individual subject. The slides are automatically changed by the programer which is connected between the slide projector and tape recorder. It is believed that this short review by audio-visual means will improve student retention of the instructional material.

Experimentation is also under way, using polarized projectuals with an overhead projector and a rotating polarized analyzer, to provide visual motion. This training aid will

provide the instructor with the means of presenting visual indications of current or electron flow in circuits, radiation of radiofrequency waves, operation of relays, and many other presentations where motion can be an aid to understanding. Through this simulated motion or technimated material, class interest should be increased, motivation should be greater, and a better understanding of basic electronics achieved. Retention should be improved, since it is human nature to remember more of what is seen than heard. The addition of motion to schematic diagrams provides another method of presenting instructional material dealing with circuitry. It is anticipated that these new methods will further facilitate the training of future electronics maintenance technicians.

GUIDED MISSILE SYSTEMS OFFICER COURSE (44-A-1181)

The Guided Missile Systems Officer Course (44-A-1181) is a branch immaterial college-type course in the physical sciences and a senior engineer-type course in practical work. It is the most advanced course on the physical sciences and guided missile systems taught in the Army school system. It is designed to provide commanders with well-educated staff officers who have the ability to understand and interpret current and future scientific aspects of guided missile systems — officers who, by virtue of their scientific training, can fill key assignments with the technical knowledge demanded in this space age.

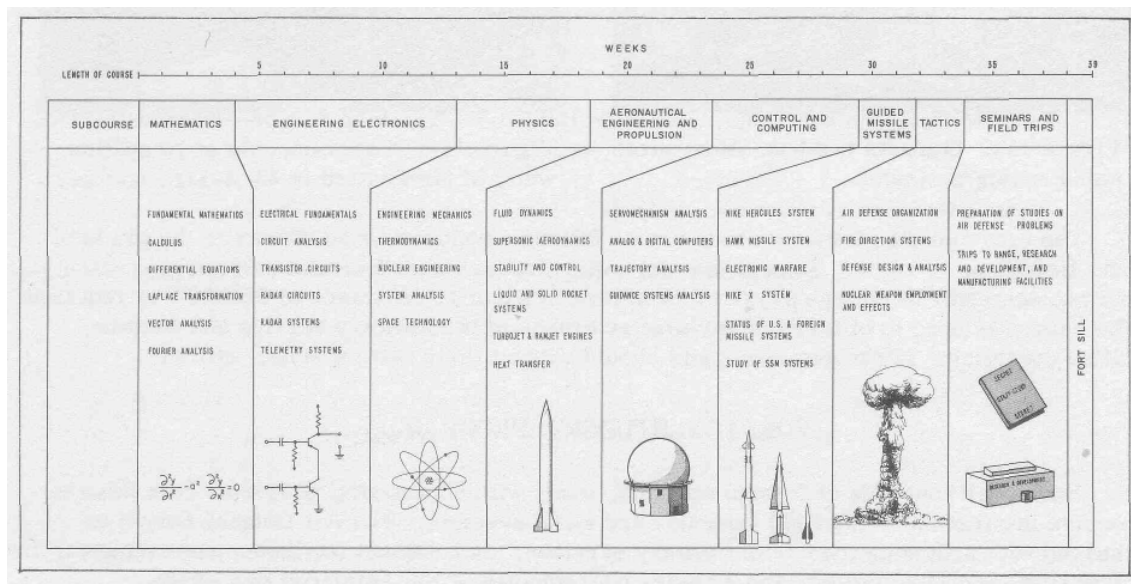


Figure 109. Guided Missile Systems Officer Course curriculum.

The curriculum of the course (fig 109) is based on 18 years' experience—the first course was conducted in 1946—with constant emphasis on improvement. For the first time, in FY 62, students were sent to Fort Sill, Oklahoma, to study surface-to-surface missile systems as a part of their practical work. The future curriculum will see more academic time spent on design technology. New and improved training aids are constantly being obtained. Such equipment now includes a subsonic wind tunnel, a laboratory-type analog computer (fig 110), microwave optics equipment, a four-joule ruby laser (fig 111), and a

laboratory demonstration unit for transistor instruction. In addition, students spend 20 hours programming a digital computer.

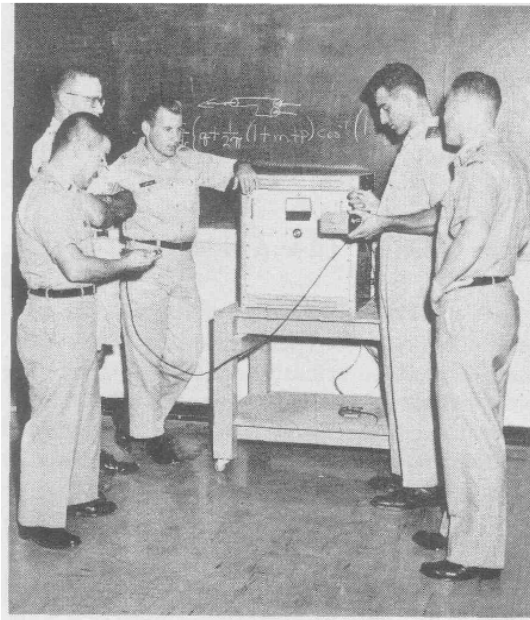


Figure 110. Students in 44-A-1181 course using analog computer.

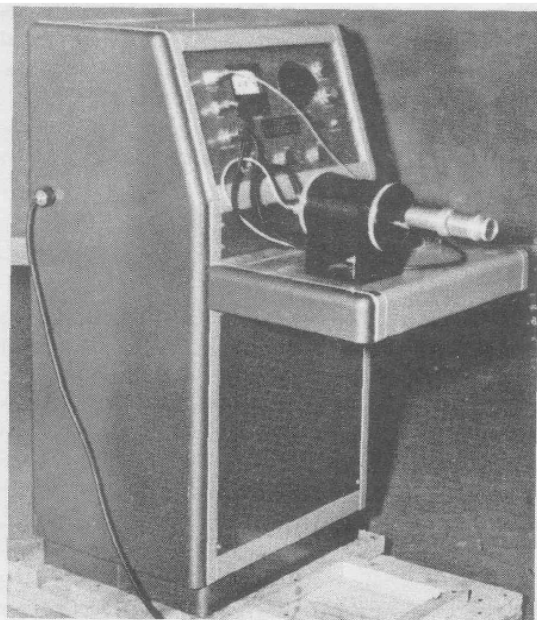


Figure 111. Laser capable of 10 million watts of power used in 44-A-1181 course.

The prerequisites for attendance are as follows: commissioned officer in the grade of first lieutenant or higher, completion of a college course in differential and integral calculus, and one semester of college physics. A minimum security clearance of SECRET is required. The course is open to officers of any arm or branch of the military service and certain Allied countries. Interested applicants should contact their unit personnel officers.

FOREIGN STUDENT PROGRAM

Each year hundreds of foreign students, many with dependents, arrive at Fort Bliss to receive instruction on the Nike Hercules and Hawk systems. The Air Defense School is charged with providing them with military services, recreational facilities, entertainment programs, social activities, and a basic understanding of the American way of life.

Training is accomplished through two Government programs: the Military Assistance Program (MAP) and the Military Assistance Sales (MAS) Program. MAP is the United States program for providing military assistance under the Mutual Security Act of 1954 as distinct from economic aid. This assistance includes furnishing of military materiel and training assistance through grant aid or military sales to eligible nations as specified by Congress. Under the MAS Program, purchase of an AD system by a country and training of that country's personnel at Fort Bliss is authorized.

Training is conducted for individual students and groups to provide the key personnel required for a complete unit, such as a battalion. The normal procedure for training a unit (fig 112) is described below.

Initially, Department of the Army gives the U.S. Army Air Defense Center a time frame in which a non-U.S. missile battalion is to be trained. The Air Defense Center recommends a starting date for the training, based on its capacity to train a battalion during the recommended time frame. If the starting date is agreeable to the nation concerned and if equipment is available, the School is requested to schedule and conduct training for the battalion key personnel.

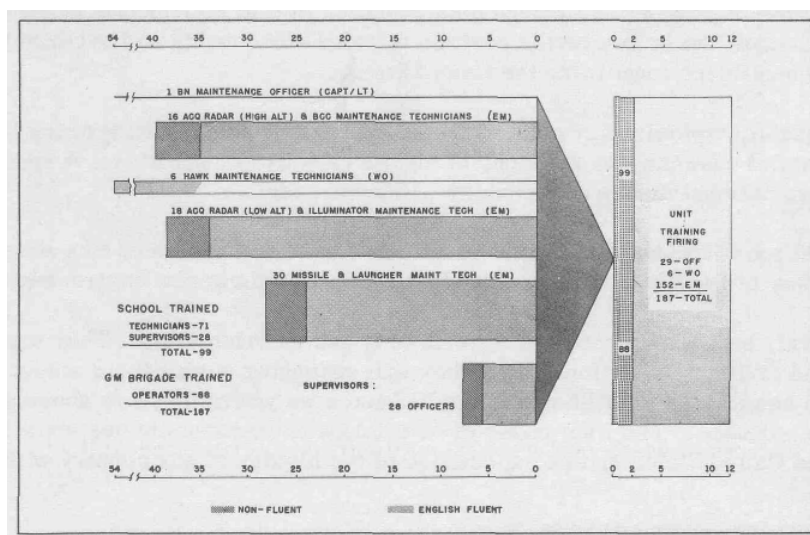


Figure 112. Typical non-U.S. Hawk unit training program.

The School must schedule key personnel so all personnel finish their School courses simultaneously. Because of the difference in length between supervisory, operations, and technician courses, the starting dates for courses are staggered.

Another factor which enters into determining the starting dates for the classes is the English-speaking ability of the students. If the students are not fluent in English, as determined by the MAAG from the country concerned, the course length is increased to allow for interpreters to translate instruction in the classroom.

Upon completion of School training, the battalion draws its equipment and begins unit training under the 1st Air Defense Guided Missile Brigade (Training) at Fort Bliss. The brigade trains fire control crewmen, missile launcher crewmen, and radio operators, creating the new missile unit by combining School-trained personnel with brigade-trained personnel to complete the unit package.

Tactical exercises and unit proficiency tests are conducted to uncover any existing training and equipment problems. Upon completion of the unit training cycle, the package

normally conducts a live missile service practice at McGregor Range to determine its combat readiness. When the package is determined to be combat ready, the unit returns to its home country for deployment.

The Allied Student Battalion was organized to handle this large influx of Allied students. Divided into six sections — administration, operations, activities, supply, mail, and buildings and grounds—the battalion can supply all of the many needs of the Allied students.

Besides the standard duties of a battalion, the Allied Student Battalion has the added mission of giving the students as much knowledge of the United States —its customs, habits, and everyday life—as possible. Through dissemination of this information and the student's personal experiences, he is in a better position to judge our country and to carry home valid ideas and sentiment concerning the United States.

In the messhall, typical American food is served with special consideration to satisfy the requirements of customs and religions of all the various nationalities. A special effort is made to serve national dishes of a country whenever possible.

The largest job of the battalion, and a particularly unique one, is to educate students in the American way of life while making them feel at home in their new environment.

Upon arrival, each group receives a welcoming and an orientation. They are briefed on all Army and civilian regulations which they will encounter during their stay. They are then taken on a bus tour of Fort Bliss and the El Paso area where they are shown places of interest and importance. The final phase of orientation consists of movies showing different areas of the United States and an explanation of the history of our country with emphasis on the Southwest.



Figure 113. Foreign students in home of civilian family sponsors.

To make the students' stay more enjoyable, several programs have been organized. A sponsorship program has been started with the cooperation of several El Paso civic *organizations*. Under this program, civilian and military families invite Allied students into their homes (fig 113) as part of their families. Here the student observes the American family and participates in family events. Special attention is paid to showing the students how we celebrate special holidays. Through this means, they learn about our culture and feel more at home in a strange country. This program has been enthusiastically received by students and local families, both believing they are receiving the better part of the bargain.

A special tour program has also been arranged to provide additional sightseeing, recreation, and educational opportunities. On free afternoons, classes can request a guided

tour of numerous industries, businesses, or points of interest. Here they see America at work. These tours include Texaco Refinery, Stahmann Farms, El Paso Times and Herald-Post, the Tony Lama boot factory, El Paso National Bank, and the City-County Building. Each tour is personally guided by an official of the organization so numerous questions can be readily answered.

On weekends, free out-of-town tours are provided to the many historical and geological points of interest in the Southwest. Some of the more interesting tours are those to Carlsbad Caverns (fig 114), Kennecott Copper Company's mining and smelting plant, White Sands National Monument, and Ruidoso. Transportation is provided by Government bus or, if the distance is more than 75 miles from the post, by commercial bus.



Figure 114. Allied students tour Carlsbad Caverns.

The Allied Student Battalion works closely with all El Paso civic organizations. Allied students frequently receive free tickets to civic events or are given a reduced rate. They are invited to numerous parties and functions sponsored by organizations and individuals in the area. Assistance is offered to students planning vacations in this country. Included are suggested routes and points of interest, approximate cost of the trip, reservations at YMCA's, and reduced rates at some attractions, such as Disneyland.

Allied students, as a whole, are avid sports enthusiasts; consequently, they support an extensive sports program. Facilities available are volleyball courts (fig 115), European handball courts, boxing ring, trampoline, fencing equipment, and judo and karate classes. During the spring and fall, soccer leagues are organized, with four to six teams participating.



Figure 115. Volleyball game between Korean and Belgian teams.

The foreign student program is complementary. The program is designed to assist the foreign student; however, the student and his family, in turn, represent to El Paso residents and Fort Bliss personnel the culture and customs of their country. This interchange reaps benefits of far-reaching significance—the firm friendships formed being the basis of lasting goodwill.

Chapter 7

United States Army Air Defense Activities

KEEPING ABREAST OF TECHNICAL DEVELOPMENTS

Guided missile materiel is under constant study by manufacturers, tactical units, technical agencies, the U.S. Army Air Defense Board, Combat Developments Command Air Defense Agency, and the Air Defense School. Studies are conducted to detect materiel weaknesses and to improve maintenance and operational procedures.

To assist the School in keeping abreast of the latest AD materiel developments, representatives are stationed at the School of Artillery, Pembrokeshire, Manorbier, Wales; at the Pacific Field Office, Nike X Project, Kwajalein Atoll, Marshall Islands; and at the Bell Telephone Laboratories, Whippany, New Jersey.

The close working relationship of the School with the Air Defense Board and Combat Developments Command Air Defense Agency is a contributing factor in keeping abreast of technical developments. The Air Defense Executive Conference (ADEX) grew from this relationship.

AIR DEFENSE EXECUTIVE CONFERENCE

The Air Defense Executive Conference was established to create a relaxed, friendly, and informal atmosphere for exchanging AD information and developing a mutual understanding of AD problems. The conference consists of monthly meetings of senior representatives of the Air Defense School, Air Defense Board, Combat Developments Command Air Defense Agency, and 1st Air Defense Guided Missile Brigade (Training).

To broaden the scope of information exchanged, standing invitations to participate are extended to other Army agencies closely associated with solving AD problems. These include the U.S. Army Air Defense Center, U.S. Army Air Defense Command, U.S. Army Missile Command, Ordnance Guided Missile School, Combat Developments Command Experimentation Center, Air Defense Human Research Unit, and White Sands Missile Range.

The meetings, conducted at Fort Bliss, are primarily concerned with doctrine, policy, planning, testing, training, and future developments; the approach being at the executive command level.

COMBAT DEVELOPMENTS COMMAND AIR DEFENSE AGENCY

The U.S. Army Combat Developments Command Air Defense Agency (USACDCADA) was organized as a class II activity at Fort Bliss on 1 July 1962. This agency is part of the U.S. Army Combat Developments Command (USACDC) established in the 1961 reorganization of the Army. USACDCADA is responsible to the Commanding General, USACDC, through the U.S. Army Combat Developments Command, Combined Arms Group, Fort Leavenworth, and is one of 10 branch or combat functional agencies of the Combined Arms Group.

USACDCADA is charged with determining how AD units should be organized and equipped and how they should fight. These tasks are accomplished by studying future requirements and preparing tables of organization and equipment (TOE) for all AD units, qualitative materiel development objectives (QMDO), qualitative materiel requirements (QMR), small development requirements (SDK) for AD equipment, and doctrinal field manuals on air defense employment. USACDCADA represents the user in the development cycle, participates in development of the maintenance package, and reviews equipment technical manuals.

The development of organizational concepts, materiel requirements, and doctrine requires close coordination with many agencies. USACDCADA maintains liaison with the Communications-Electronics Agency of USACDC for the use of frequencies, with the Aviation Agency of USACDC for the use of airspace, and with other combined arms agencies as the plans and programs become more finalized. Liaison is also maintained with major oversea commands and Allied nations to facilitate a fully coordinated national and international air and space defense program and to take advantage of technical developments made by others. Close coordination with the Air Defense School, Air Defense Board, and other agencies at Fort Bliss permits taking advantage of the knowledge of AD personnel assigned to these agencies. USACDCADA keeps these agencies informed of new developments so future requirements for training mechanics, operators, and supervisors for future ADA systems can be planned.

U.S. ARMY AIR DEFENSE BOARD

The Air Defense Board, a class II activity at Fort Bliss, is a subordinate command of the U.S. Army Test and Evaluation Command, Aberdeen Proving Ground, Maryland. The Board's mission is to plan and conduct service tests, evaluations, check tests, and confirmatory tests. It participates in planning and conducting engineering tests; planning, supervising, and monitoring troop tests; and providing guidance during development of AD equipment.

Included in the Board's general field of responsibility are AD weapon systems, fire distribution systems, AD ECM and ECCM equipment and devices, and nuclear demolition munitions. It furnishes guidance to Department of the Army in selecting training devices, preparing training literature, determining maintenance packages, and conducting in-process reviews during equipment development. The Board works with the contractors and Army agencies concerned to insure that equipment meets military characteristics and user requirements. Close liaison is maintained with the Navy, Marine Corps, and Air Force and with United Kingdom and Canadian standardization representatives on AD items of mutual interest.

The Board is organized into three divisions to accomplish its responsibilities. The Missile Systems Test Division is responsible for test research and development pertaining to surface-to-air missile systems, predicted fire weapons, target drones, nuclear warheads, and nuclear demolition munitions. The Electronics Systems Test Division is responsible for matters pertaining to fire distribution systems; radars; ECM and ECCM components; identification, friend or foe (IFF), devices; engine generators; and simulators. A Support Division is responsible for gathering and reducing test data and providing general support for Board test activities.

U.S. ARMY AIR DEFENSE HUMAN RESEARCH UNIT

The U.S. Army Air Defense Human Research Unit (ADHRU) is a combined military-civilian organization established by Department of the Army and The George Washington University, Human Resources Research Office (HUMRRO). The ADHRU conducts research in training methods, needs for training devices, motivation, and leadership in AAD as mutually agreed upon by the Department of the Army and HUMRRO.

Current research tasks of this unit are concerned with:

- Improving methods of training electronic maintenance personnel (Task HAWKEYE).
- Determining feasibility of improving radar operator performance through training (Task VIGIL).
- Determining fidelity requirements for training devices for fixed-procedure tasks (Task RINGER).

In addition, exploratory studies are being conducted to determine the desirability of conducting further research in the following fields:

- Visual recognition of aircraft.
- Methods of improving motivation of students in Army service schools.
- Methods of improving quality control procedures in Army service schools.

Army, Fort Bliss, Texas
SEC 15318

ERRATA

Make the following pen and ink changes:

- Page 40, line 6: AN/MSQ-38 to AN/MSQ-28
- Page 40, line 9: eletron- to electron-
- Page 47, line 22: delete the word "unit"

